

A new species of *Microglanis* Eigenmann, 1912 (Siluriformes, Pseudopimelodidae) from rio São Francisco basin, Brazil

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Abstract

Microglanis leptostriatus n. sp. is described from the middle-upper rio São Francisco basin. The new species is distinguished from its congeners by the following combination of characters: light transverse stripe, located in occipital region between the opercular openings, thin and sinuous; pale region below dorsal and adipose fins mottled with brown spots; and a dark stripe in the axis of gill filaments in alcohol preserved specimens. *Microglanis leptostriatus* is further distinguished from *M. parahybae* and *M. garavelloii*, the closest species geographically, by having the following combination of characters: longer head length [28.3–32.1% of SL (mean = 30.0) versus 25.5–28.5% (mean = 27.2) and 25.2–30.2 (mean = 28.0), respectively], shorter dorsal spine length [11.7–14.9% of SL (mean = 13.6) versus 14.1–18.1% (mean = 16.0) and 11.3–19.0 (mean = 15.5)], shorter pectoral spine length [12.5–19.7% of SL (mean = 17.4) versus 19.4–22.7% (mean = 20.6) and 18.5–26.2 (mean = 22.1)].

Key words: Bumble bee catfishes, Biogeography, Systematics

Resumo

Microglanis leptostriatus sp. n. é descrita da região médio-alta da bacia do rio São Francisco. A nova espécie distingue-se de suas congêneres pela seguinte combinação de caracteres: faixa transversal clara, localizada na região occipital entre o final das aberturas operculares, muito mais estreita e sinuosa; região pálida abaixo da nadadeira dorsal e adiposa pigmentada com pontos escuros; listra escura no eixo dos filamentos branquiais em exemplares preservados em álcool. Além disso, *Microglanis leptostriatus* distingue-se de *M. parahybae* e *M. garavelloii*, as espécies geographicamente mais próximas, por apresentar a seguinte combinação de caracteres: maior comprimento da cabeça [28,3–32,1% do CP (média = 30,0) vs. 25,5–28,5% (média = 27,2) e 25,2–30,2 (média = 28,0), respectivamente], menor comprimento do espinho da nadadeira dorsal [11,7–14,9% do CP (média = 13,6) vs. 14,1–18,1% (média = 16,0) e 11,3–19,0 (média = 15,5)], menor comprimento do espinho da nadadeira peitoral [12,5–19,7% do CP (média = 17,4) vs. 19,4–22,7% (média = 20,6) e 18,5–26,2 (média = 22,1)].

Introduction

The genus *Microglanis* was proposed by Eigenmann (1912) to include *Microglanis poecilus* and related species of reduced size, reaching a total length of nearly 110 mm (Eigenmann, 1912). This genus is further characterized by the wide mouth (gape same of the head width), short barbels (occasionally reaching pectoral-fin origin), small eyes without free orbital margin, absence of axillary pore, a dark saddle straddling supraoccipital area to the end of dorsal-fin base, pre-maxillary dental plate with rounded margin and thin mesocoracoid arch (Shibatta, 2003a; 2003b).

Fourteen species are valid in the genus, occurring from trans-Andean drainages in Peru and Ecuador, eastward to the Orinoco and Amazon basins and southward to the río de la Plata basin, Argentina (Bertaco & Cardoso, 2005; Shibatta & Benine, 2005). *Microglanis* is also present in the eastern coastal rivers of Brazil, with the following species: *M. cibelae* Malabarba & Mahler-Jr., 1998 (rio Maquiné basin, RS), *M. cottoides* (Boulenger, 1891) (rio Camaquã basin, RS), *M. parahybae* (Steindachner, 1880) (rio Paraíba do Sul basin, RJ) and *M. nigripinnis* Bizerril & Perez-Neto, 1992 (rio Macacu basin, RJ) (Bizerril & Perez-Neto, 1992; Malabarba & Mahler-Jr., 1998; Shibatta, 2003a).

Samples of *Microglanis* were recently collected in the rio São Francisco basin. This is an independent hydrographic basin and has an area of 634 km² (Cunha, 1998), across the Brazilian States of Minas Gerais, Bahia, Pernambuco, Sergipe and Alagoas. The peculiar geomorphologic aspects and the occurrence of endemic species (e.g., *Conorhynchus conirostris* (Valenciennes, 1840), *Duopalatinus emarginatus* (Valenciennes, 1840), *Franciscodoras marmoratus* (Reinhardt, 1874), *Lophiosilurus alexandri* Steindachner, 1876, among others), suggest an old isolation of the rio São Francisco system. Examination of specimens of *Microglanis* from this basin reveals that they constitute a new species, with a set of distinctive morphological characters. This new species is described herein.

Material and methods

Measurements were taken point-to-point, on the left side of the specimen, with a digital caliper to the nearest 0.01 mm. Methodology of measurements follows Malabarba & Mahler-Jr. (1998) and Bertaco & Cardoso (2005) with addition of: snout length (measured from the tip of the snout to the anterior rim of the orbit), pelvic-fin length (measured along longest ray) and postcleithral process length (from the anterior base of pectoral-fin to the ossified tip of postcleithral process).

In the description, the frequency of each count is provided in parentheses after the respective count and counts of the holotype are indicated by asterisk. In fin-ray counts, the anterior unbranched rays are represented by lower case Roman numerals and branched rays by Arabic numerals.

The comparative material is listed in the appendix. Morphological data for *M. malabarbai* and *M. pellopterygius* are based on literature accounts (Bertaco & Cardoso, 2005; Mees, 1978, respectively).

Institutional abbreviations follow Leviton *et al.* (1985), with addition of LBP (Laboratório de Biologia de Peixes da Universidade Estadual Paulista, campus de Botucatu, SP), MCP (Museu de Ciências da Pontifícia Universidade Católica, RS) and Museu de Zoologia da Universidade Estadual de Londrina (MZUEL).

***Microglanis leptostriatus*, new species**

Fig. 1

Holotype. MZUSP 85985 (42.3 mm SL), rio Verde Grande, 16° 39'S/46°11'57,8"W, Montes Claros, State of Minas Gerais, Brazil, 31.viii.2004, A. Akama *et al.*

Paratypes. Brazil. Minas Gerais: MCP 16647 (10 specimens, 18.88–30.45 mm SL), rio Carinhanha, 16.vii.1993, R. E. Reis *et al.*; ANSP 172127 (10 specimens), Rio da Cruz on road from Januaria to Fabiao, 15°20'44"S, 44°14'02"W, W. Saul *et al.*, 14.vii.1993; MZUEL 3733 (6 specimens, 19.29–27.33 mm SL), from the same locality and collectors as ANSP 172127; MZUSP 47408 (5 specimens, 17.90–24.39 mm SL), rio Serra Branca, Porteirinha, 23.vii.1994, MZUSP/USNM/UFSCar Expedition; MZUSP 47456 (2 specimens, 28.33–28.35 mm SL), Montes Claros, rio Verde, 23.vii.1994, MZUSP/USNM/UFSCar Expedition; MZUSP 86144 (11 specimens, 24.74–36.63 mm SL), collected with the holotype.

Diagnosis. The following combination of characters differs *Microglanis leptostriatus* from its congeners: light transverse stripe, located in occipital region between the opercular openings, thin and sinuous, sometimes discontinuous; pale region below dorsal and adipose fins mottled with brown spots; dark stripe in the axis of gill filaments in alcohol preserved specimens (figure 2). *Microglanis leptostriatus* is further distinguished from *M. parahybae* (table 1) and *M. garavelloii*, the closest species geographically, by having the following combination of characters: longer head length [28.3–32.1% of SL (mean = 30.0) versus 25.5–28.5% (mean = 27.2) and 25.2–30.2 (mean = 28.0), respectively], shorter dorsal spine length [11.7–14.9% of SL (mean = 13.6) versus 14.1–18.1% (mean = 16.0) and 11.3–19.0 (mean = 15.5)], shorter pectoral spine length [12.5–19.7% of SL (mean = 17.4) versus 19.4–22.7% (mean = 20.6) and 18.5–26.2 (mean = 22.1)].

Description. Morphometric data summarized in Table 1. Head and anterior portion of body depressed, becoming laterally compressed from pectoral girdle towards caudal region. Greatest body depth at dorsal fin origin, greatest body width at pectoral fin base. Anterior dorsal profile of body straight or gently convex, ventral profile gently convex. Head broader than long, rounded in dorsal view. Eyes small, superior, orbital rim not free, covered by skin. Snout short, anterior nostril tubular, close to upper lip; posterior nostril

with raised flap close to eye. Mouth wide and terminal. Premaxillary tooth patch rounded, without backward projecting angles; teeth small and villiform. Dentary tooth patch semicircular, longer than premaxillary tooth patch. Barbels thin, flattened in cross section. One maxillary and two mental pairs of barbels. Maxillary barbel longest, reaching base of pectoral spine. Lateral line incomplete, with 7* (6), 8(10), 9 (10), 10 (2), 11 (1) pores, reaching vertical line through posterior base of dorsal fin. Lateral line followed by isolated neuromasts as far posteriorly as vertical line through middle of adipose-fin. Gill membranes free. Gill rakers filiform; gill rakers on first arch 1,1,4 (4), 1,1,5 (7), 1,1,6 (1), 2,1,4 (3), 2,1,5 (5), 2,1,6 (6), 2,1,7* (3). Dorsal fin rounded, positioned anterior of middle of standard length, with one spinelet and I+6 rays. Anterior and posterior margins of dorsal spine smooth. Dorsal spine short, smaller than soft rays. Elongated adipose fin with free posterior margin. Caudal-fin emarginate, with upper lobe a little more developed than lower, both lobes with rounded tips; principal caudal rays, 12 (4), 13* (23), 14 (1). Pectoral-fin triangular. Tip of adpressed pectoral fin does not reach base of pelvic fin. Pectoral fin I+5. Anterior margin of spine with small retrorse hooks proximally followed by antrorse hooks distally; posterior margin of spine with strong antrorse hooks along entire length, larger than those along anterior margin. Post-cleithral process slender and pointed. Pelvic-fin rounded with six soft rays. Origin of pelvic fin in vertical line through last soft ray of dorsal-fin. Tip of adpressed pelvic-fin does not reach anal-fin. Anal fin short and rounded, its base shorter than length of adipose fin and not confluent posteriorly with caudal-fin. Anal-fin iii,6 (1), iii,7 (5), iii,8 (4), iv,6 (10), iv,7* (8), iv,8 (1).

Color in alcohol. Head darker brown in dorsal view with two yellowish V-shaped blotches near posterior nares and yellowish vertical blotch on posterior cheek below eye and reaching isthmus. Light transverse stripe, narrow and sinuous (sometimes discontinuous), on occipital region between opercular openings. Barbels pigmented with brown spots. Body tan with dark brown saddles separated by light brown interspaces. Anteriormost dark brown saddle in nuchal region (anterior to dorsal-spine origin), second below dorsal-fin base; first two saddles separated dorsally by light oval spot under dorsal-fin spine, confluent ventrally above horizontal through pectoral-spine origin. Third dark brown saddle in interdorsal region and below middle of adipose-fin base continuing ventrally to about lateral line, not reaching dark blotch on base of anal fin (interrupted middorsally by longitudinally elongate pale oval at anterior insertion of adipose fin). Broad, irregularly-shaped dark brown blotch on caudal peduncle. Two small and light elliptical spots on caudal peduncle: one middorsal, located between posterior tip of adipose fin and base of caudal fin; another midventral between posterior tip of anal fin and base of caudal fin. Ventral region of body and head pale yellow. All fins hyaline with brown spots or bands. Dorsal fin hyaline, with dark brown base and broad dark brown band crossing middle portions of fin spine, rays and membranes. Adipose fin with narrow dark brown blotch at center along base flanked anteriorly and posteriorly by lighter brown blotches; distal margin pale. Pectoral fins with dark brown mottling on spines and middle

TABLE 1. Morphometric data of the holotype and paratypes of *Microglanis leptostriatus*, from rio São Francisco basin, Minas Gerais, Brazil; and *M. parahybae* from rio Paraíba do Sul basin, Rio de Janeiro, Brazil.

	<i>Microglanis leptostriatus</i>				<i>M. parahybae</i>						
	Holotype	Paratypes				n	Low-high	Mean ± SD	n	Low-high	Mean ± SD
Characters		n	Low-high	Mean ± SD		n	Low-high	Mean ± SD			
Standard length (mm)	42.3	28	17.9–36.6	26.0±5.5		11	29.4–38.7	32.4±3.0			
Percents of SL											
Head length	28.6	28	28.3–32.1	30.0±1.0		11	25.5–28.5	27.2±1.2			
Interorbital width	12.5	28	11.0–13.2	12.1±0.7		11	10.6–11.9	11.4±0.5			
Orbital diameter	3.2	28	2.4–3.2	2.8±0.2		11	2.7–3.5	3.1±0.2			
Snout length	10.6	28	9.6–12.0	10.9±0.6		11	9.3–11.1	10.4±0.6			
Mouth width	18.4	28	16.0–22.7	18.8±1.7		11	16.3–19.7	18.0±1.0			
Maxillary barbel length	30.3	28	20.9–37.4	30.1±3.2		11	21.2–39.5	30.8±5.7			
Pelvic-fin length	16.7	28	15.6–19.7	17.4±1.0		11	15.8–20.9	17.9±1.4			
Dorsal-fin spine length	11.6	28	11.7–14.9	13.6±0.9		11	14.1–18.1	16.0±1.1			
Pectoral-fin spine length	16.1	28	12.5–19.7	17.4±2.0		11	19.4–22.7	20.6±0.9			
Humeral process length	11.9	28	11.1–13.7	12.2±0.8		11	12.0–14.6	13.3±1.4			
Predorsal length	35.6	28	34.7–39.2	37.4±1.2		11	34.9–39.0	36.6±1.7			
Prepelvic length	52.6	28	48.4–54.1	51.8±1.4		11	48.5–53.2	50.8±2.1			
Preanal length	70.1	28	67.3–73.2	70.7±1.6		11	66.2–73.1	69.1±2.1			
Caudal peduncle depth	11.6	28	11.3–14.4	12.4±0.7		11	9.9–11.9	11.3±0.6			
Caudal peduncle length	16.7	28	14.1–17.7	15.7±0.9		11	14.1–18.8	16.8±1.3			
Body width	29.4	28	24.9–29.5	27.5±1.2		11	23.6–26.9	25.9±1.1			
Dorsal-fin base length	14.1	28	12.4–15.4	14.1±0.6		11	12.2–15.5	13.7±1.0			
Adipose-fin base length	25.5	28	18.0–26.4	22.0±2.2		11	15.7–27.9	22.9±3.4			
Anal-fin base length	13.7	28	12.7–15.9	14.0±0.7		11	12.0–17.8	14.7±1.5			
Percents of HL											
Interorbital width	43.8	28	36.8–44.2	40.3±2.2		11	39.6–45.1	42.1±1.4			
Orbital diameter	11.3	28	7.9–10.7	9.4±0.7		11	9.8–13.7	11.4±1.1			
Snout length	37.2	28	33.2–39.7	36.2±1.8		11	35.4–40.5	38.3±1.6			
Mouth width	64.2	28	50.6–75.1	62.9±6.5		11	60.2–74.7	66.2±4.1			
Maxillary barbel length	105.7	28	68.2–122.3	100.6±11.1		11	76.3–149.8	113.8±23.7			

portions of rays and membranes. Pelvic fins hyaline, lightly speckled with small dark spots. Caudal fin with dark brown vertical band crossing middle portions of upper and

lower lobes. Anal fin with dark blotch on bases of third, fourth, fifth, sixth and seventh rays and dark brown crescentic band on middle portions of rays and membranes. Dark stripe in the axis of gill filaments.



FIGURE 1. *Microglanis leptostriatus*, MZUSP 85985, holotype, 42.28 mm SL. Rio Verde Grande, rio São Francisco basin, Montes Claros, Minas Gerais, Brazil.

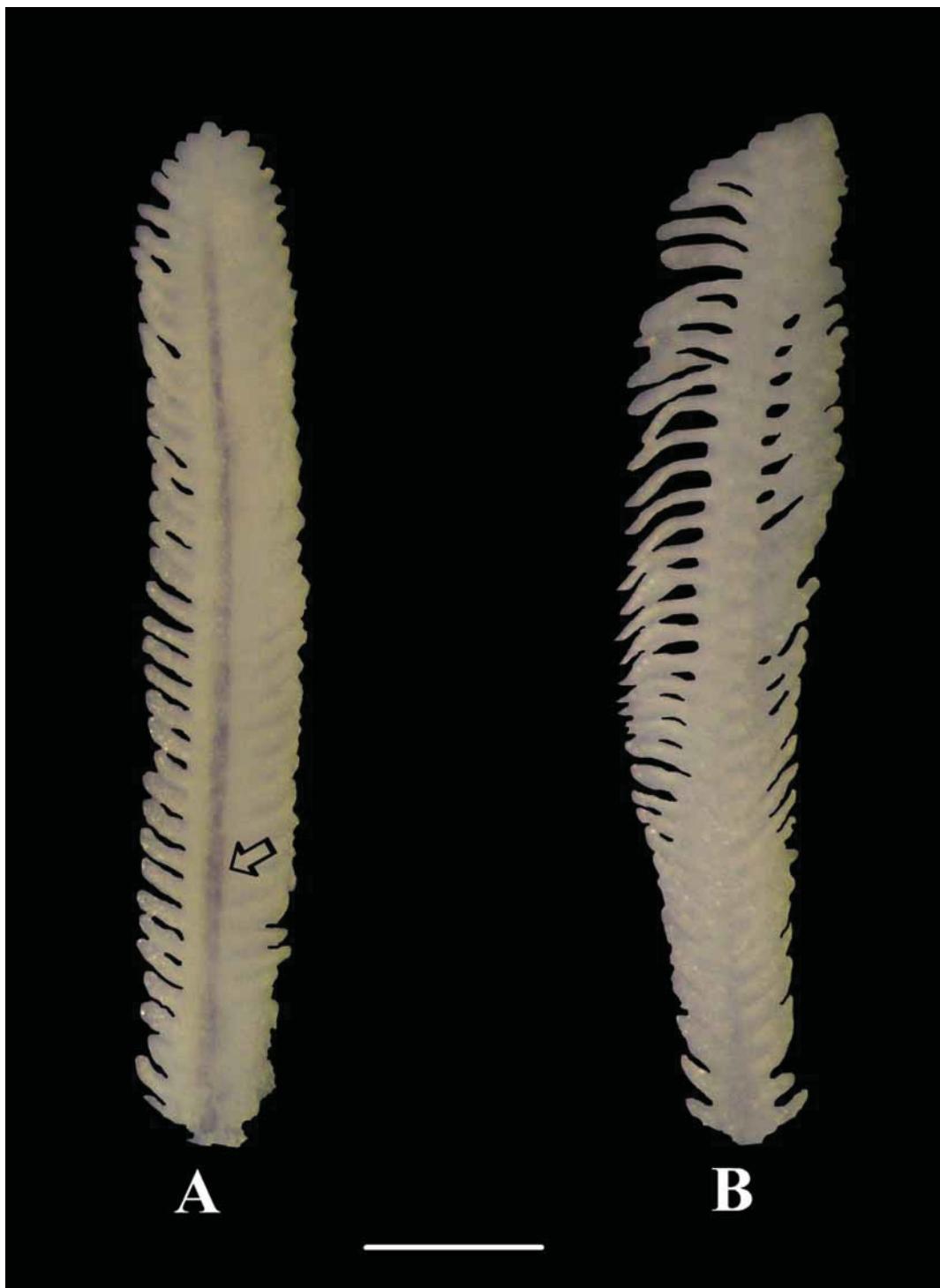


FIGURE 2. Lateral view of gill filaments of *Microglanis leptostriatus* (A), MZUSP 86144, paratype, 34.29 mm SL, and *M. parahybae* (B), MNRJ 16047, 36.01 mm SL. Arrow indicating the dark stripe. Scale bar = 0,1 mm.

Distribution. *Microglanis leptostriatus* is known from the tributaries of the middle-upper course of rio São Francisco basin (figure 3).

Etymology. The name *leptostriatus* is derived from the Greek *lepto*, slender, plus *striatus*, stripe, in reference to the distinct light transverse stripe in the nuchal region. An adjective.

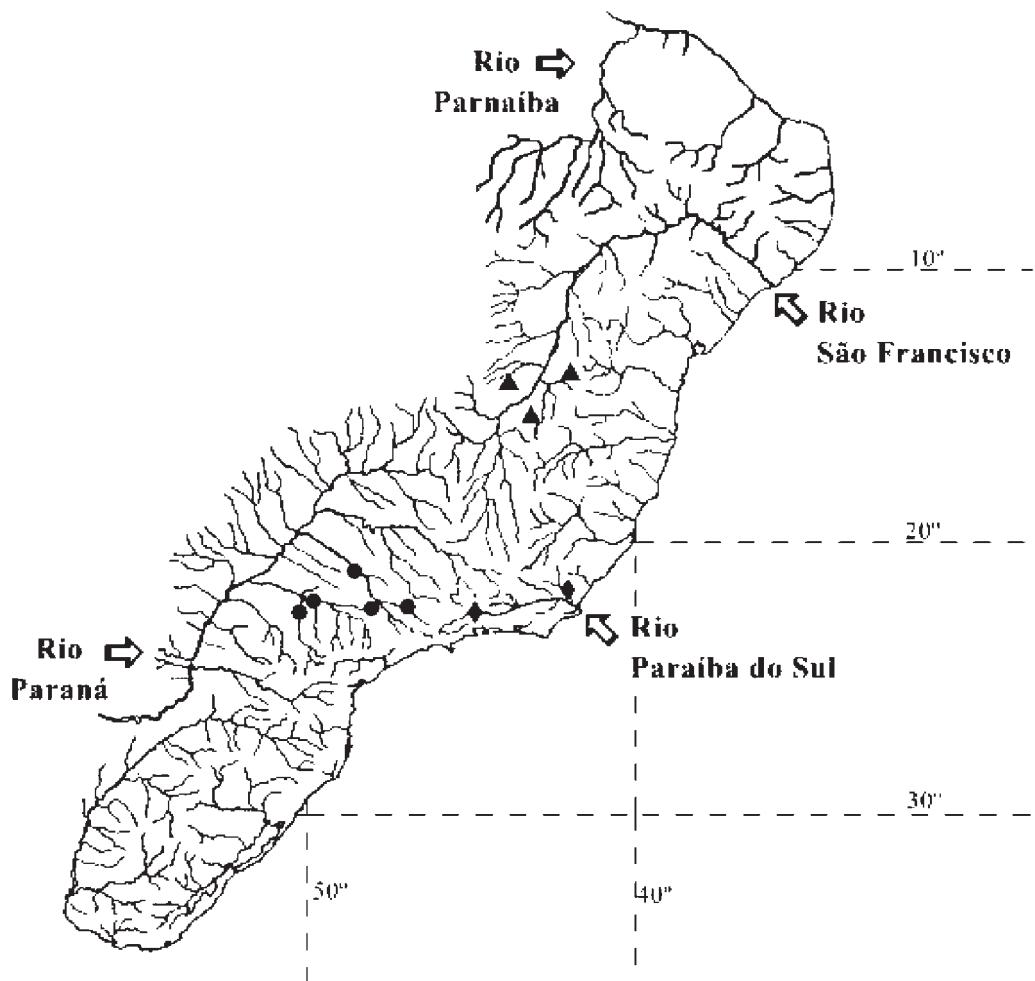


FIGURE 3. Distribution map of *Microglanis leptostriatus* (▲) in the middle-upper course of rio São Francisco basin, (●) *M. garavelloii* and (◆) *M. parahybae*. Localities of *M. garavelloii* and *M. parahybae* after Shibatta & Benine (2005).

Discussion

Microglanis leptostriatus is distinguished from the other species in the genus by having pectoral and anal fins mottled or with relatively faint bands (vs. heavy dark bands in *M. ater*, *M. pellopterygius* and *M. nigripinnis*); trunk with dark brown saddles (vs. mottled in

M. variegatus); caudal fin emarginate (vs. rounded in *M. zonatus*); tip of pectoral spine as distinct bony point (vs. tip of pectoral spine soft, not as distinct bony point, and implanted between two teeth, one straight, pointing outwards from anterior margin and the other curved, pointing backwards from posterior margin in *M. secundus* (*sensu* Mees, 1974)); continuous portion of lateral line not reaching vertical through origin of adipose fin (vs. reaching vertical through adipose-fin origin in *M. iheringi*); caudal peduncle with faint to dark blotch irregularly shaped (vs. triangular in *M. poecilus*); caudal peduncle depth 11.3–17.7% of SL (vs. 8.8–10.3% of SL in *M. eurystoma*); trunk short relative to head (vs. long in *M. cibelae*); caudal fin lightly mottled with narrow vertical dark brown band across central portions of lobes (vs. caudal fin almost completely black with narrow vertical white band across central portions of lobes in *M. malabarbai*); dark saddle beneath adipose fin not extending ventrally to anal fin as continuous bar (vs. dark bar on posterior flank continuous from base of adipose fin to that of anal fin in *M. malabarbai* and *M. cottoides*); caudal peduncle depth 11.3–17.7% of SL (vs. caudal peduncle depth 9.8–11.4% of SL in *M. parahybae*).

All examined specimens of *M. leptostriatus*, presented the dark stripe in the axis of gill filaments (dark stripe not observed in any other examined species of *Microglanis*). The fact that all the specimens presented this character ensures that it is not a consequence of fixation or conservation.

Microglanis leptostriatus, *M. garavelloii* and *M. parahybae* are members of the *M. parahybae* species-complex based on their possession of the following combination of characters: body light brown with first and second dark brown saddles not surpassing pectoral-fin, with light oval spot located below dorsal-fin spine; third dark brown saddle finishing midlaterally, not reaching dark blotch on base of anal fin; and caudal fin with upper lobe slightly more developed than lower. This group occurs in coastal rivers from the rio São Francisco southward to the rio Paraíba do Sul, and in the upper rio Paraná basin.

The species of the *parahybae* group, as well as the whole coastal ichthyofauna, may have resulted from vicariant events in the eastern coastal region of South America during the Upper Pleistocene (Weitzman *et al.* 1988). During maximum glaciation sea levels were lower (marine regression), which may have contributed to the formation of an extensive coastal plain, exposing practically the whole continental platform (Secretaria de Estado do Meio Ambiente, 1996; Suguio, 1999). Hypothetically, this marine regression elongated the coastal fluvial courses and allowed for past communications among rivers in the immense plain. Such communication would facilitate the dispersion of fishes between the ancient rivers of the Brazilian coast.

However, the presence of *Microglanis leptostriatus* in the rio São Francisco basin does not imply, necessarily, the same history of distribution of its congeners from eastern coastal rivers. The geographical isolation of rio São Francisco population probably precedes the events of glaciation of Pleistocene and this may be an indication of an older

inland distribution, when the upper rio São Francisco, upper rio Paraná and, perhaps some coastal drainages were not separated (Beurlen *apud* Kullander, 1983). According to Kullander (1983), in the Lower Tertiary Period, the rio Paraná drained to the north towards the current rio São Francisco and rio Tocantins; and the lower course of the rio São Francisco drained northward towards the current rio Parnaíba (figure 2) until the Quaternary Period (Pleistocene/Pliocene). Kullander still suggests that the upper courses of rio Paraná and rio São Francisco were isolated in the Middle or Upper Tertiary, resulting in the isolations of the species *Cichlasoma sanctifranciscense* Kullander, 1983 in the rio São Francisco, and *C. paranaense* Kullander, 1983 in the rio Paraná. Recently, *Microglanis garavelloii* from Upper Paraná was described (Shibatta & Benine, 2005) and seems to be of the *parahybae* group. *Microglanis garavelloii* is similar to *M. leptostriatus*, and their close relationship may corroborate the hypothesis proposed for the isolation of species of *Cichlasoma* (Kullander, 1983).

In agreement with Kullander (1983), we conclude that the isolation of the basins of upper courses of rio Paraná and rio São Francisco (Middle or Upper Tertiary) was previous to the isolation of rio São Francisco and rio Parnaíba basins (Quaternary). However, the absence of records of *Microglanis* in the rio Parnaíba basin, until the moment, disables inferences regarding the history of dispersion of the genus among these two drainages.

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Appendix

Comparative material (with range of standard length in millimeters).

Microglanis ater. 'Mittelbrazil'. ZMB 20932 (66.0)

M. cibelae. Brazil. Rio Grande do Sul: MCP 20724, arroio Água Parada (rio Tramandaí basin), 25.i.2001 (5, 37.1–48.1); MCP 26962, tributary of arroio Pinheiro (rio Tramandaí basin), 30.i.1998 (5, 38.6–58.5). Santa Catarina: MCP 14686, rio Canoas (rio Mampituba basin), 16.i.1991 (5, 37.1–67.9).

M. cottoides. Brazil. Rio Grande do Sul: MCP 22733, arroio do Tigre (rio Jacuí basin), 04.iv.1999 (40.8); MCP 23004, arroio Bom Jardim (rio Jacu basin), 09.ix.1998 (2, 32.3–38.7); MCP 23079, rio São Sepé (rio Jacu basin), 07.v.1999 (2, 22.5–25.8); MCP 23786, arroio do Tigre (tributary of arroio Velhaco – rio Camaquã basin), 26.vi.1999 (6, 23.2–27.6); MCP 23787, arroio Teixeira (Lagoa dos Patos drainages), 26.vi.1999 (24.8); MCP 23788, rio Buricá (Lagoa dos Patos drainages), 27.vi.1999 (2, 24.6–45.7); MCP 33560, rio Taquari (rio Jacuí basin), 26.ix.2002 (55.5).

Microglanis eurystoma. Brazil. Rio Grande do Sul: Paratypes, MCP 12698, Arroio do Passo Alto, (12, 26.7–40.8).

Microglanis garavelloii. Brazil: Paraná: MZUSP 88006, Holotype, ribeirão Taquari, 20.xiii.1999 (31.7).

Microglanis iheringi. Venezuela: Turmero: USNM 121985, Paratype, R. Turmero, (30.0). Portuguesa: CAS 64403, Cano Marac en el puente 60 km via Guanare-Guanarito Rd (9, 23.4–39.5).

M. nigripinnis. Brazil. Rio de Janeiro: MZUSP 80223, tributary of rio São João (on the road Boqueirão–Japuíba, in Gaviões), 12.x.2002 (45.2); MZUSP 80229, tributary of rio São João (on the road Boqueirão–Japuíba, in Gaviões), 12.x.2002 (2, 39.3–47.0).

M. parahybae. Brazil. Minas Gerais: LBP 1111, rio Cachoeira do Pacu (rio Paraíba do Sul basin), 14.x.2001 (1, 34.1). Rio de Janeiro: MNRJ 15989, rio Dois Rios (rio Paraíba do Sul basin), 26.iv.1997 (5, 29.4–34.0); MNRJ 16047, rio Muriaé (rio Paraíba do Sul basin), i.1990 (5, 29.4–38.7).

Microglanis poecilus. Guyana. CAS 63679, Paratypes, Essequibo River, below Packeoo Falls (2, 24.1 – 25.3).

Microglanis secundus. Brazil. Pará: INPA 5730, rio Trombetas, (7 ex., 30.4 – 17.9); INPA 7950, rio Trombetas (6, 26.2 – 17.1).

Microglanis variegatus. Ecuador. Vinces: CAS 17971, Holotype, (45.0); CAS 63688, Paratype (2, 28.5–36.7).

Microglanis zonatus. Peru. CAS 17970, Holotype, R. Morona (19.9).